

Pavement Standards Team (PST)

Number: PSTPA-01

Pavement Advisory

Effective Date: IMMEDIATE

Approval Date: April 13, 2004

Title: Dowel Bar Retrofit Projects

This advisory only affects dowel bar retrofit projects. Dowel bar installations continue to be the standard for lane replacements and new concrete pavements.

ISSUE

A number of dowel bar retrofit projects placed within the past few years are demonstrating signs of premature failure, including cracking and “pop outs” of the grout. The cause and extent of these reported failures is unknown at this time. The Division of Engineering Services’ Materials Engineering and Testing Services (METS) is beginning a study to review previously built dowel bar retrofit projects. The goals of the study are to identify possible causes of deterioration, develop repair strategies, recommend changes to design, and identify improvements to construction inspections. It is expected the study will extend over a year in duration, but implemental results will be disseminated as generated throughout the study period.

Since the intention of the dowel bar retrofits is to extend pavement life and reduce maintenance costs, and because premature failures can both reduce pavement life and increase maintenance costs, the Pavement Standards Team (PST) is issuing this advisory to inform districts of the situation and provide guidance on how to proceed with ongoing projects.

BACKGROUND

Dowel bar retrofits are an effective pavement strategy that can extend the life of Portland Cement Concrete pavement a minimum of 10 years. This strategy has been used successfully in many states throughout the nation for over 10 years. It is generally less expensive to construct and easier to maintain than crack seat and overlay projects, provided it is designed and constructed correctly. Guidance and background information on dowel bar retrofits can be found on the California Department of Transportation’s Pavement website under Technical Guidance at the following address:

<<http://www.dot.ca.gov/hq/oppd/pavement/guidance/dowel-bar-guidelines.pdf>>

RECOMMENDED ACTIONS

- **Interim Repairs of Failed Dowel Bar Retrofit Locations**

Locations where dowel bar retrofits are failing should be repaired as quickly as possible. For recommendations on interim repairs, please contact Tom Pyle, Chief of METS' Office of Rigid Pavement Materials and Structural Concrete, at (916) 227-7281, or Shakir Shatnawi, Chief of the Office of Pavement Preservation in the Division of Maintenance, at (916) 227-5706.

- **Projects Currently in Construction**

An important aspect to the success of dowel bar retrofits is quality workmanship and materials. Resident Engineers and their staff should pay close attention to the construction of these projects and should strictly enforce the details of the specifications and special provisions. Special attention should be given to the following items, which are in the special provisions:

- The approved grout must be mixed in conformance with the manufacturer's instructions and the special provisions. Using too much water, retempering the grout, or using aggregate extensions will weaken the grout significantly, resulting in premature failure.
- The cleanliness of the dowel slots prior to placing grout is critical. Slots should not have dust or particulate matter on the bottom or walls when grout is placed. Slots shall be dry prior to placing grout.
- Ensure grout is placed uniformly around the dowel bar. This can be done by coring select dowels.
- Dowel bars should be placed in accordance with the details shown on Standard Plan A35D and secured so they will not move when grout is placed.

For further information regarding projects in construction, contact Chuck Suszko, Chief of the Office of Construction Engineering in the Division of Construction, at (916) 227-7314.

- **Projects Scheduled to Ready to List (RTL) in Fiscal Year (FY) 2003/04 and FY 2004/05**

It is recommended that dowel bar retrofit strategies not be included in projects that will RTL before July 1, 2005. Should the district decide to proceed with the dowel bar retrofit project this year, please contact the PST to obtain the most current information and

recommendations for the project plans, specifications, and construction oversight. For further information, contact William K. Farnbach, Chief of the Office of Pavement Design in the Division of Design, at (916) 227-7324.

• **Projects Scheduled to RTL After FY 2004/05 or Not Currently Programmed**

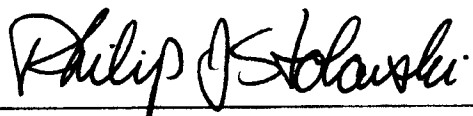
The PST and the Division of Maintenance do not recommend or encourage any action to these projects at this time. Since the previously mentioned study concerning dowel bar retrofit projects should be completed before the end of FY 2004/05, new standards, specifications, and guidance should be in place before these projects are advertised.

Districts are reminded that not all locations benefit from a dowel bar retrofit. Faulting by itself is not sufficient justification for a dowel bar retrofit. Other criteria (such as loss of load transfer between concrete slabs) need to be met. Districts should conduct/request testing of the existing pavement to see if a dowel bar retrofit is warranted. METS' Office of Pavement Rehabilitation (OPR) should be consulted regarding the testing and analysis of existing pavements. For further information, contact Peter Vacura, Chief of the OPR, at (916) 227-5845, or Imad Basheer, Pavement Rehabilitation Design Branch of the OPR, at (916) 227-5840. For questions or information regarding programming of projects or currently programmed projects, contact Susan Massey, Chief of the Office of Roadway Rehabilitation in the Division of Maintenance, at (916) 654-4792.

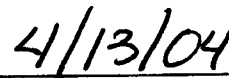
DURATION

This advisory will expire on July 1, 2005, or upon completion of study and Pavement Program Steering Committee approval of recommendations.

APPROVED



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Date